EXTRACTION OF SHRIMP PONDS USING OBJECT ORIENTED CLASSIFICATION VIS-À-VIS PIXEL BASED CLASSIFICATION

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KEY WORDS: Object oriented classification, eCognition, IRS LISS, shrimp farm

ABSTRACT: Rapid expansion of coastal aquaculture/shrimp farming in several countries has necessitated the inventory and monitoring of shrimp farms. These are essential tools for decision making on aquaculture development, including regulatory laws, environmental protection and revenue collection. In the context of aquaculture development policies of respective governments, much attention are focused on the identification and classification of shrimp farms, often located in remote areas. This study examines classification of shrimp farms using pan sharpened IRS LISS-III image of the Kandleru creek area of Andhra Pradesh, India. IRS satellite image is subjected to pixel based vis-à-vis object oriented classification for improving the identification of shrimp farms in the area.

Most traditional pixel-based classification approaches are based exclusively on the digital numbers of the pixels taking only the spectral information in the scene into account. It does not consider the visible characteristics like pattern, texture, shape of a ground feature. Features having similar spectral response become difficult to distinguish from each other and are often classified into the same feature type. Active shrimp farms mostly having water depth of 1-2 meters hardly are differentiated from shallow rivers. Likewise, dry ponds under preparation, between crop cycles, or abandoned are not differentiable from bare land or sandy patches depending on the spectral response. Pan sharpened IRS LISS image resolution supports visual identification of the dykes and canals in a shrimp farm otherwise neglected by the traditional pixel based classification. Isodata unsupervised and supervised maximum likelihood classifications were performed on the scene to extract the shrimp ponds both dry and filled. The above problem is found to hinder successful extraction of the ponds.

An object-oriented classification is suggested in order to overcome this limitation. E-Cognition software allows the polygon based classification process. It is based on fuzzy logic, allows the integration of a broad spectrum of different object features, such as spectral values, shape and texture. In contrast to classic image processing methods, the basic processing units of object-oriented image analysis are image objects or segments and not single pixels. One motivation for the object-oriented approach is the fact that, in many cases, the expected result of most image analysis tasks is the extraction of real world objects, proper in shape and proper in classification. The present study demonstrates improvements in the identification and extraction of shrimp farms and ponds irrespective of their states in the farming cycle using the object based classification of the features of interest only.

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